Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
MAT115	Fundamentals of Mathematics	1	3	2	0	5	8

Prerequisites	
Admission Requirements	

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	The course introduces students to the basic language, methods, and foundational structures of modern mathematics. It includes on propositional and predicate logic, quantifiers, methods of proof, sets, relations, functions, and cardinality. A further objective is to develop familiarity with axiomatic set theory, particularly the Zermelo--Fraenkel axioms with the Axiom of Choice (ZFC), and to explain the role of Cantor's work in the modern understanding of infinite sets.
Content	This course provides an introduction to mathematical reasoning and the foundations of mathematics. It begins with propositional logic, predicates, and quantifiers, followed by standard methods of proof. The course then develops the elementary theory of sets, set operations, relations, and functions. The final part introduces Cantor's theory of infinite sets, the axiomatic framework of ZFC, and the comparison of finite and infinite cardinalities. Throughout the course, formal definitions and elementary proofs are used to develop the language and habits of rigorous mathematical argument.
References	-Mathematical Proofs: A Transition to Advanced Mathematics Gary Chartrand, Albert D. Polimeni, Ping Zhang -Mathématiques 1ère année, Cours et exercices, Deschamps et Warusfel - Matematiğe Giris¸ I-II, Ali Nesin, NMKY - Math en Ligne de Bernard Ycart: https://ljk.imag.fr/membres/Bernard.Yc art/mel/ -Sezgisel Kümeler Kuramı, Ali Nesin, NMKY

Theory Topics

Week	Weekly Contents
1	Introduction to logic
2	Proof methods
3	Quantifiers
4	Set theory
5	Operations of sets
6	Relations
7	Functions
8	Mid-term examination
9	Induction
10	Cantor, Russell et ZFC
11	L'Axiom du Choix
12	Cardinalities
13	Cardinalities
14	Revision